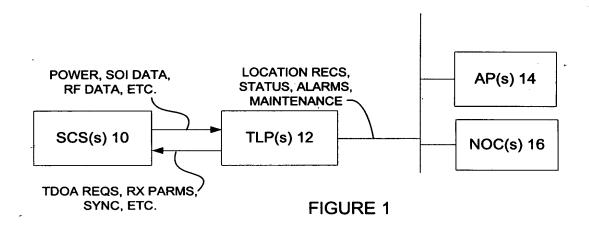
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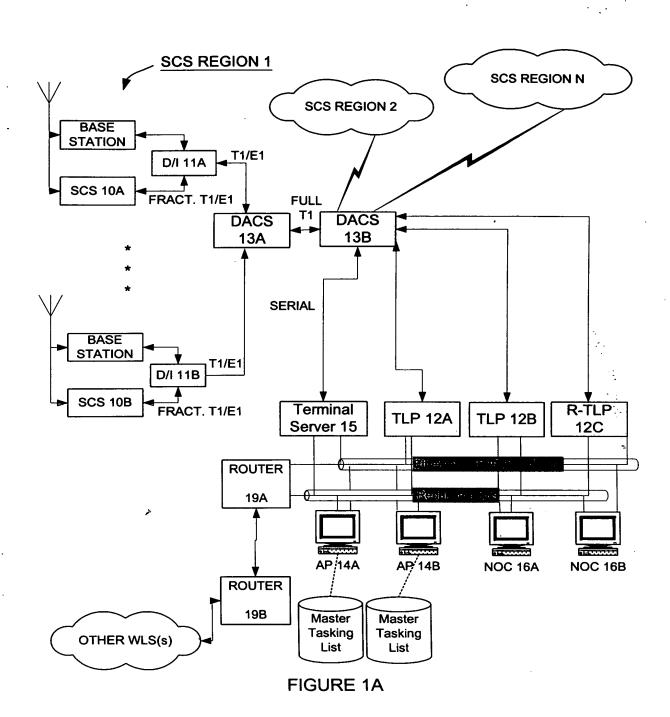
mentors: Robert J. Anderson et al.
Filing Date: 07/18/2001; Serial No.: 09/908,998
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et No.: TPI-0329

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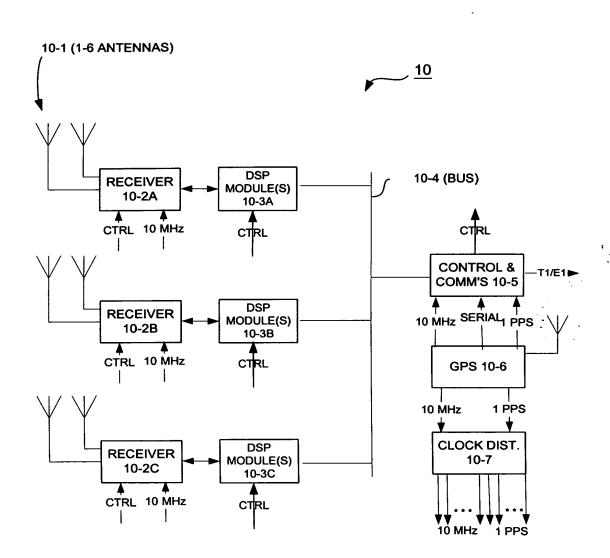


FIGURE 2

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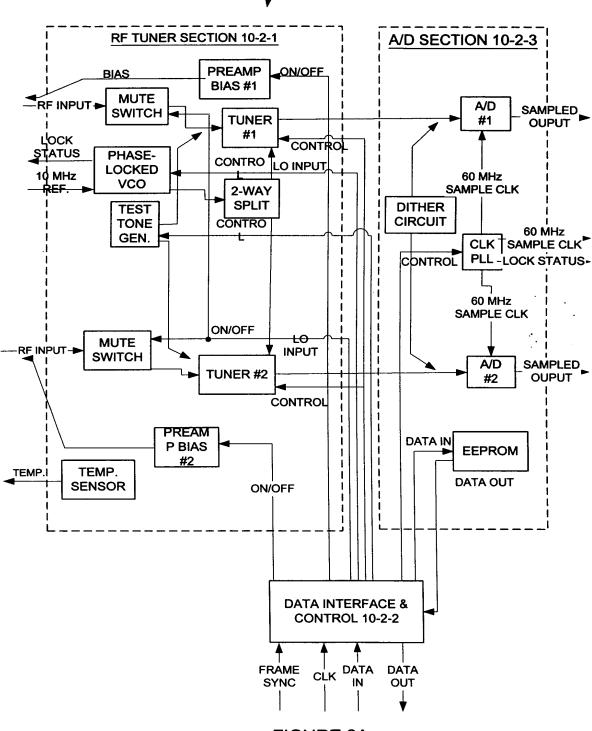
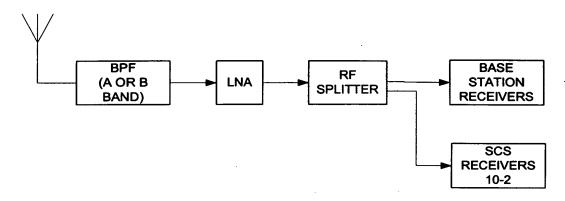


FIGURE 2A

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FIGURE 2B

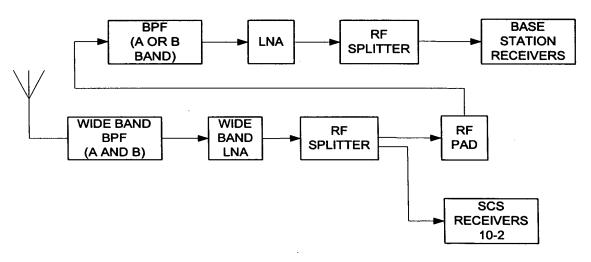


FIGURE 2C

htors: Robert J. Anderson et al.

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FIRST WIRELESS
TRANSMITTER ENGAGED
IN TRANSMITTING ON A
PARTICULAR RF CHANNEL

WLS TRIGGERS ON MAKING A LOCATION ESTIMATE OF FIRST WIRELESS TRANSMITTER

WLS DETERMINES CELL
SITE, SECTOR, RF
CHANNEL, TIMESLOT, MASK
AND ENCRYPTION KEY
CURRENTLY IN USE BY
FIRST WIRELESS
TRANSMITTER

WLS TUNES FIRST
NARROWBAND RECEIVER
AT FIRST SCS 10 TO RF
CHANNEL AND TIMESLOT AT
DESIGNATED CELL SITE
AND SECTOR

FIRST SCS RECEIVES TIME
SEGMENT OF RF DATA AND
EVALUATES POWER, SNR
AND MODULATION
CHARACTERISTICS, AND,
IF POWER OR SNR IS BELOW
PREDETERMINED
THRESHOLD, WLS WAITS
PREDETERMINED TIME AND
RETURNS TO 3RD STEP

IF TRANSMISSION IS AMPS
VOICE CHANNEL
TRANSMISSION AND
MODULATION IS BELOW
THRESHOLD, THEN WLS
COMMANDS THE WIRELESS
SYSTEM TO SEND COMMAND
TO FIRST WIRELESS
TRANSMITTER TO CAUSE
"BLANK AND BURST" ON
FIRST WIRELESS
TRANSMITTER

WLS REQUESTS WIRELESS SYSTEM TO PREVENT HAND-OFF OF WIRELESS TRANSMITTER TO ANOTHER RF CHANNEL FOR PREDETERMINED PERIOD

WLS RECEIVES RESPONSE
INDICATING TIME PERIOD
DURING WHICH 1ST
TRANSMITTER WILL BE
PREVENTED FROM HANDINGOFF AND, IF COMMANDED, TIME
PERIOD DURING WHICH
SYSTEM WILL SEND COMMAND
TO 1ST TRANSMITTER TO
CAUSE "BLANK AND BURST"

WLS DETERMINES LIST OF ANTENNAS THAT WILL BE USED IN LOCATION PROCESSING

WLS DETERMINES
EARLIEST TIMESTAMP AT
WHICH NARROWBAND
RECEIVERS ARE AVAILABLE
TO BEGIN COLLECTING RF
DATA

WLS COMMANDS
NARROWBAND RECEIVERS
TO TUNE TO CELL SITE,
SECTOR AND RF CHANNEL
CURRENTLY IN USE BY 1ST
TRANSMITTER AND TO
RECEIVE RF DATA FOR
PREDETERMINED DWELL
TIME

RF DATA RECEIVED BY NARROWBAND RECEIVERS IS WRITTEN INTO DUAL PORT MEMORY LOCATION PROCESSING ON RECEIVED RF DATA COMMENCES

WLS AGAIN
DETERMINES CELL SITE,
SECTOR, RF CHANNEL,
TIMESLOT, MASK AND
ENCRYPTION KEY
CURRENTLY IN USE BY
1ST TRANSMITTER

IF CELL SITE, SECTOR,
RF CHANNEL,
TIMESLOT, MASK AND
ENCRYPTION KEY
CURRENTLY IN USE BY
1ST TRANSMITTER HAS
CHANGED BETWEEN
QUERIES, WLS CEASES
LOCATION
PROCESSING, CAUSES
ALERT MESSAGE AND
RE-TRIGGERS ENTIRE
PROCESS

LOCATION PROCESSING ON RECEIVED RF DATA COMPLETES

FIGURE 2C-1

ket No.: TPI-0329

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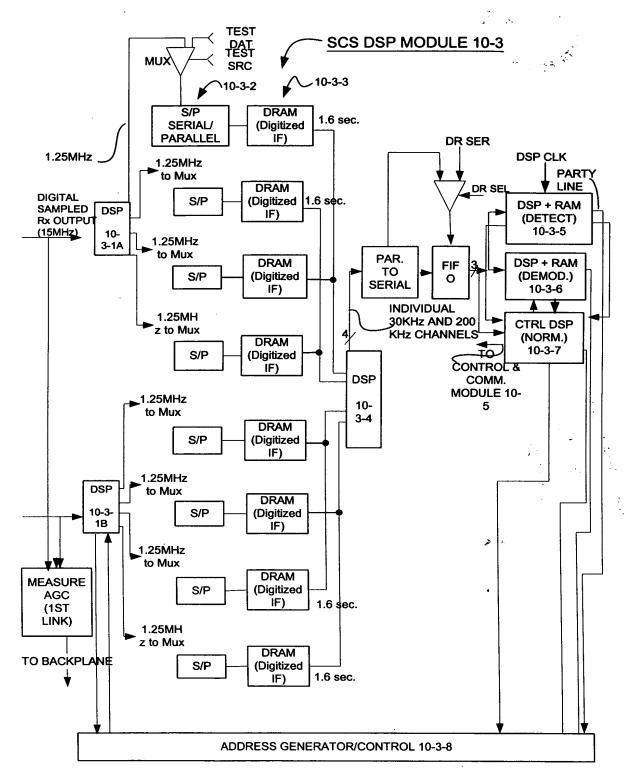


FIGURE 2D

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tors: Robert J. Anderson et al.
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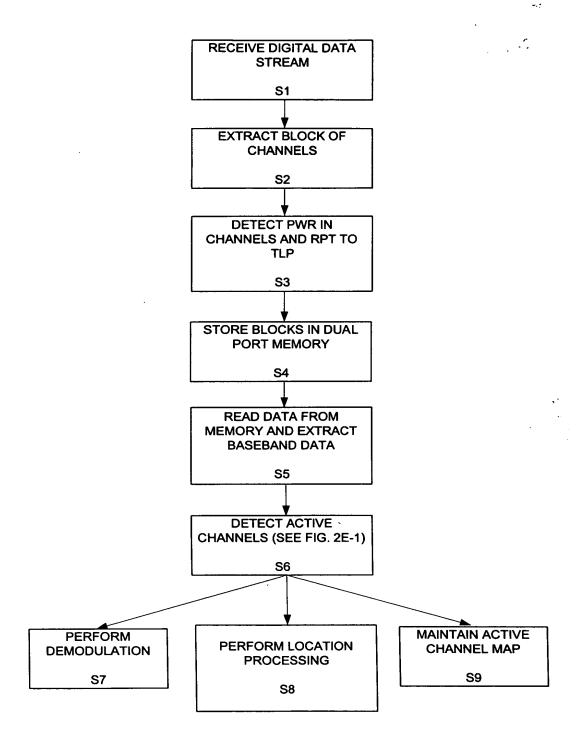


FIGURE 2E

tet No.: TPI-0329 Robert J. Anderson et al. ntors: Filing Date: 07/18/2001; Serial No.: 09/908,998 Title: METHOD FOR ESTIMATING TOOA AND FDOA IN A WIRELESS LOCATION SYSTEM Attorney: Michael D. Stein Phone: 206.332.1380 Page 9 of 24 FOR EACH POSSIBLE CONTROL AND/OR VOICE CHANNEL WHICH MAY BE USED IN THE COVERAGE AREA OF THE SCS, ESTABLISH PEG COUNTERS **S7-1** AT THE START OF A DETECTION PERIOD, RESET ALL PEG COUNTERS TO ZERO S7-2 EACH TIME A TRANSMISSION OCCURS IN A SPECIFIED RF CHANNEL AND THE RECEIVED POWER LEVEL IS ABOVE PRE-SET THRESHOLD, INCREMENT PEG COUNTER FOR THAT CHANNEL **S7-3** EACH TIME A TRANSMISSION OCCURS IN A SPECIFIED RF CHANNEL AND THE RECEIVED POWER LEVEL IS ABOVE SECOND PRE-SET THRESHOLD, ATTEMPT TO DEMODULATE A PORTION OF THE TRANSMISSION USING A FIRST PREFERRED PROTOCOL **S7-4** IF DEMODULATION IS SUCCESSFUL, INCREMENT SECOND PEG COUNTER FOR THAT CHANNEL **S7-5** IF DEMODULATION IS UNSUCCESSFUL, ATTEMPT TO DEMODULATE A PORTION OF THE TRANSMISSION USING A SECOND PREFERRED PROTOCOL **S7-6**

IF DEMODULATION IS SUCCESSFUL, INCREMENT THIRD PEG COUNTER FOR THAT CHANNEL

S7-7

AT THE END OF A DETECTION PERIOD, READ ALL PEG COUNTERS

S7-8

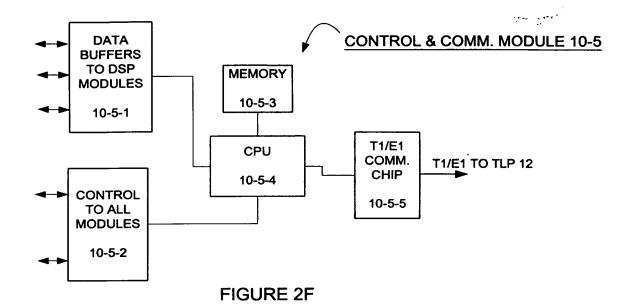
AUTOMATICALLY ASSIGN PRIMARY CHANNELS BASED UPON PEG COUNTERS

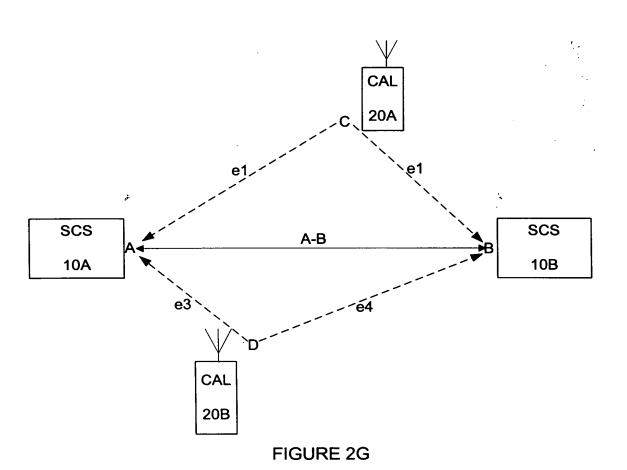
S7-9

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ventors: Robert J. Anderson et al.
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WIRELESS LOCATION SYSTEM Attorney: Michael D. Stein Phone: 206.332.1380

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TEMPORARILY,
ELECTRONICALLY
DISCONNECT ANTENNA USED
BY RECEIVER SYSTEM

S-20

INJECT INTERNALLY
GENERATED WIDE BAND
SIGNAL WITH KNOWN STABLE
SIGNAL CHARACTERISTICS
INTO FIRST RECEIVER SYSTEM

S-21

USE GENERATED WIDE BAND SIGNAL TO OBTAIN ESTIMATE OF XFER FUNCTION VARIATION ACROSS BANDWIDTH OF FIRST RECEIVER

S-22

USE ESTIMATE TO MITIGATE EFFECTS OF VARIATION OF FIRST TRANSFER FUNCTION ON TIME AND FREQUENCY MEASUREMENTS MADE BY FIRST RECEIVER

S-23

FIGURE 2H

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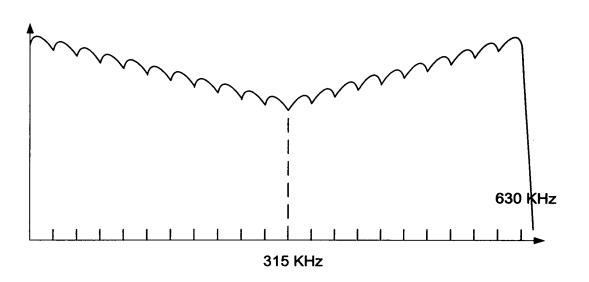


FIGURE 21

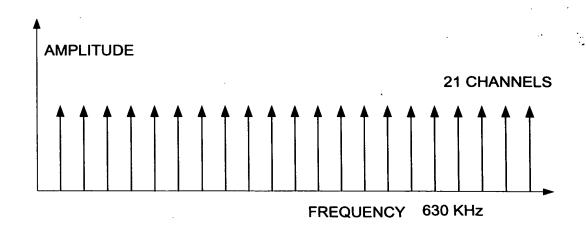


FIGURE 2J

PLACE STANDARD WIRELESS TRANSMITTERS **COMPUTE ERROR** AT VARIOUS POINTS WITHIN **BETWEEN CALCULATED** WLS COVERAGE AREA LOCATION DETERMINED BY LOCATION PROCESSING S30 AND STORED LOCATION **DETERMINED BY SURVEY S35** SURVEY POINTS AT WHICH **FIXED PHONES HAVE BEEN** STORE LOCATION, ERROR PLACED TO DETERMINE VALUE AND OTHER THEIR LOCATION TO WITHIN **MEASURED PARAMETERS** PREDETERMINED DISTANCE ALONG WITH TIME STAMP IN AP DATABASE **S31 S36** STORE SURVEYED MONITOR INSTANT ERROR AND LOCATIONS IN TABLE IN AP OTHER MEASURED PARAMETERS (EXTENDED LOCATION RECORD) **S32** AND COMPUTE STATISTICAL VALUES OF ERROR(S) AND OTHER **MEASURED PARAMETERS S37** PERMIT FIXED PHONES TO **REGISTER AT RATE AND** INTERVAL SET BY THE **WIRELESS SYSTEM** IF ANY ERROR OR OTHER VALUE **S33 EXCEEDS PRE-DETERMINED** THRESHOLD OR HISTORICAL STATISTICAL VALUE, SIGNAL ALARM TO WLS OPERATOR AT EACH REGISTRATION **S38** TRANSMISSION BY FIXED PHONE, LOCATE PHONE

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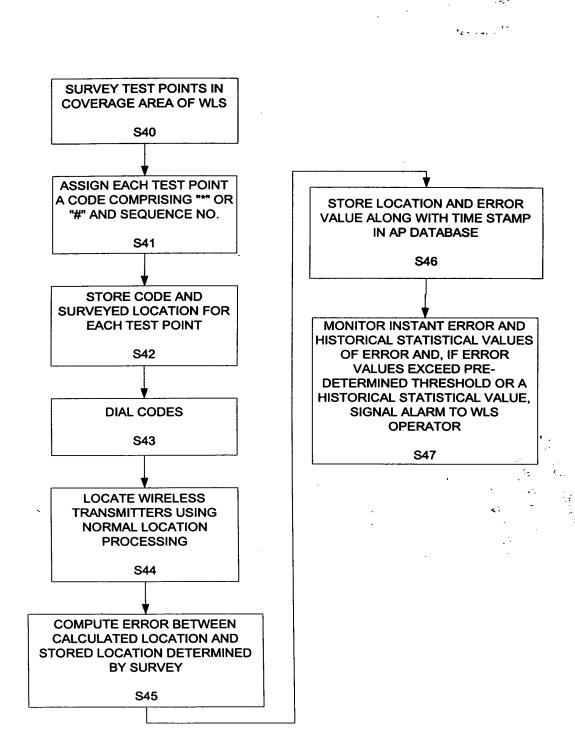
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FIGURE 2K

USING NORMAL LOCATION PROCESSING

S34



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FIGURE 2L

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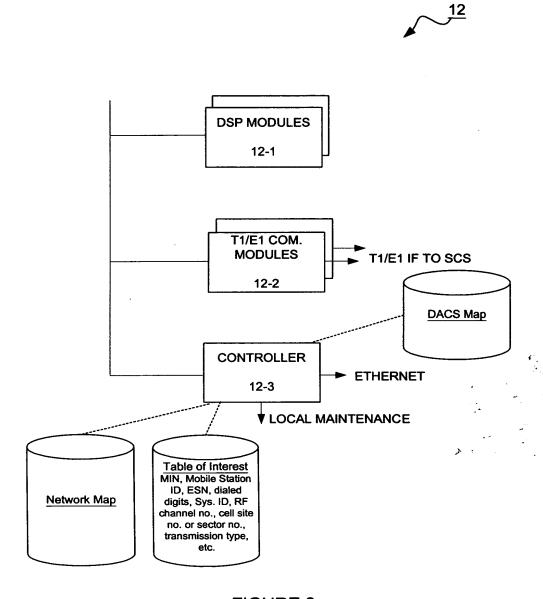


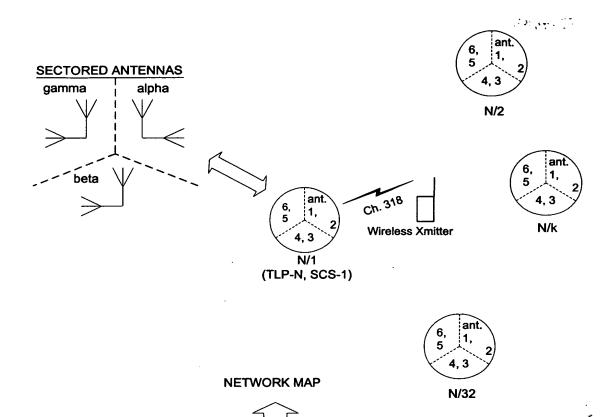
FIGURE 3

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1.5



DYNAMIC COOPERATION TABLE

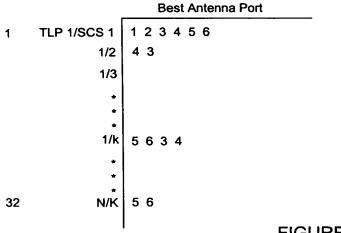


FIGURE 3A

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1.

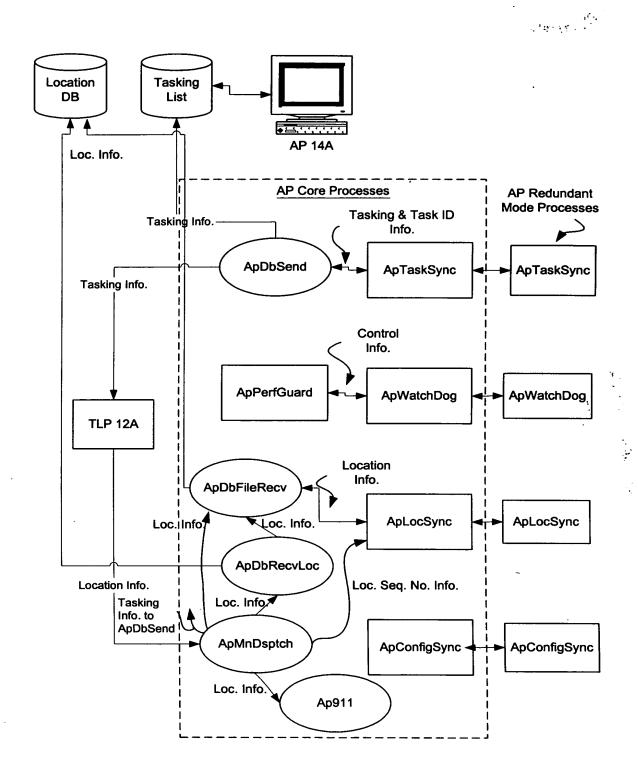


FIGURE 4

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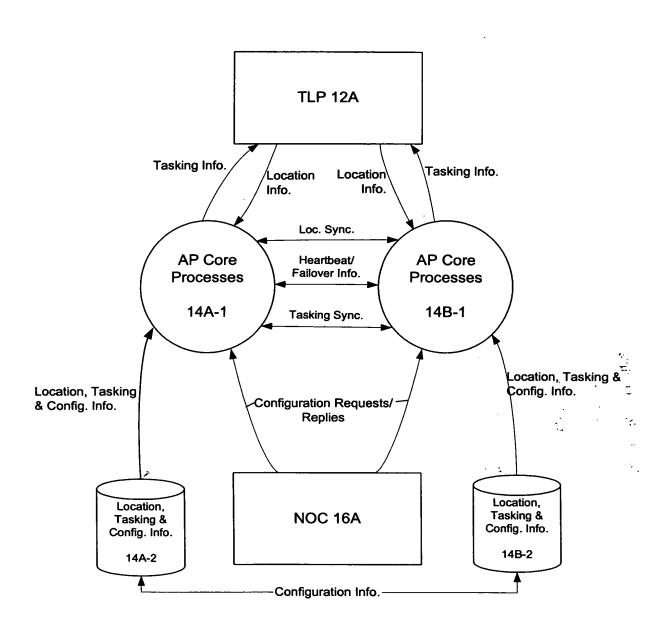
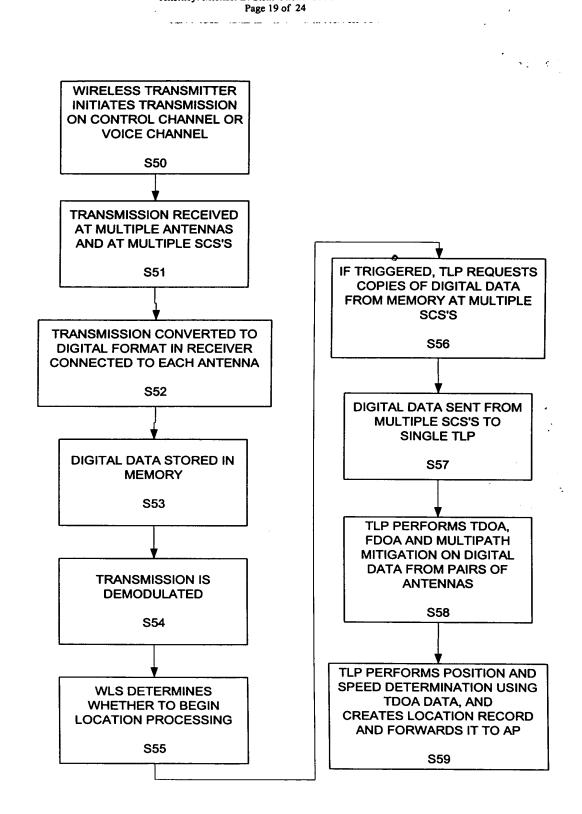


FIGURE 4A



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FIGURE 5

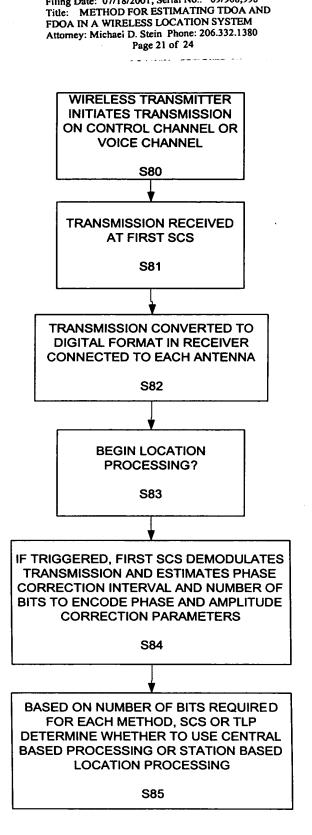
WIRELESS IF TRIGGERED, FIRST SCS TRANSMITTER FIRST SCS AND EACH **DEMODULATES INITIATES** SECOND SCS CREATE FIRST TRANSMISSION AND TRANSMISSION ON **RE-MODULATED SIGNAL DETERMINES APPROPRIATE EITHER CONTROL** AND PHASE CORRECTION **PHASE CORRECTION CHANNEL OR VOICE** AND AMPLITUDE **INTERVAL CORRECTION PARAMETERS** CHANNEL **S66 S60 S71** FOR EACH PHASE CORRECT. TRANSMISSION INTERVAL, FIRST SCS FIRST SCS AND EACH RECEIVED AT MULTIPLE **CALCULATES PHASE** SECOND SCS PERFORM **ANTENNAS AND CORRECTION & AMP.** TDOA, FDOA & MULTIPATH **MULTIPLE SCS'S** CORRECTION, AND ENCODES **MITIGATION USING DATA** PHASE AND AMP. STORED IN MEMORY & FIRST **S61 CORRECTION PARAMETERS RE-MODULATED SIGNAL** ALONG WITH DEMODULATED DATA **S72** TRANSMISSION **CONVERTED INTO S67 DIGITAL FORMAT IN** TDOA, FDOA, AND RECEIVER CONNECTED **MULTIPATH MITIGATION** TO EACH ANTENNA DATA SENT FROM FIRST SCS **DEMODULATED DATA AND** AND EACH SECOND SCS TO **S62** PHASE CORRECTION AND TLP AMPLITUDE CORRECTION PARAMETERS SENT FROM **S73** FIRST SCS TO TLP **DIGITAL DATA STORED** IN MEMORY IN SCS **S68 S63** TLP PERFORMS POSITION AND SPEED DETERMINATION TLP DETERMINES SCS'S AND **USING TDOA DATA** RECEIVING ANTENNAS TO S74 **USE IN LOCATION TRANSMISSION PROCESSING** DEMODULATED **S69 S64** TLP CREATES LOCATION TLP SENDS DEMODULATED RECORD, AND FORWARDS **DATA AND PHASE** LOCATION RECORD TO AP **WLS DETERMINES CORRECTION AND** WHETHER TO BEGIN AMPLITUDE CORRECTION **S75 LOCATION PROCESSING** PARAMETERS TO EACH SECOND SCS THAT WILL BE S65 **USED IN LOCATION PROCESSING S70** FIGURE 6

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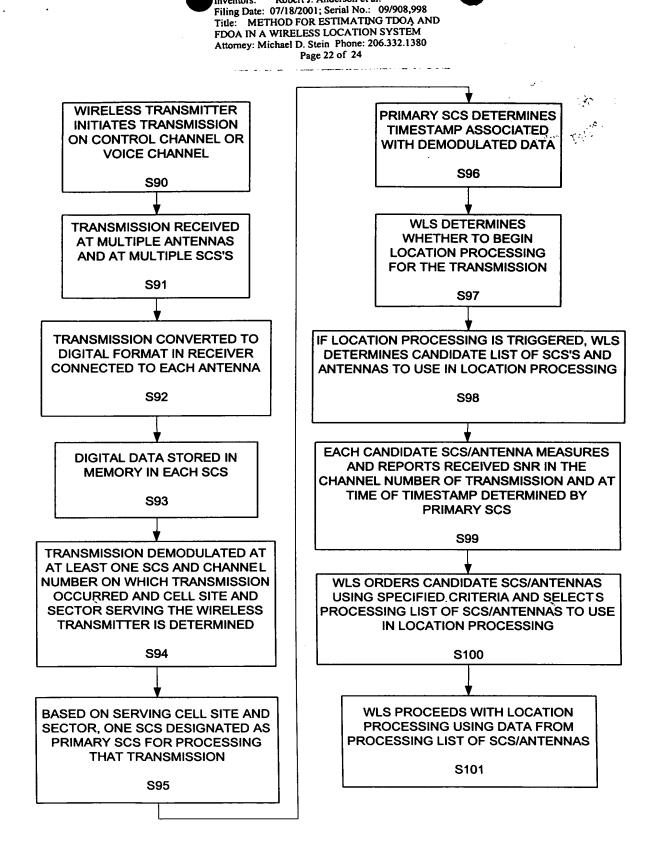


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FIGURE 7



Inventors:

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FIGURE 8

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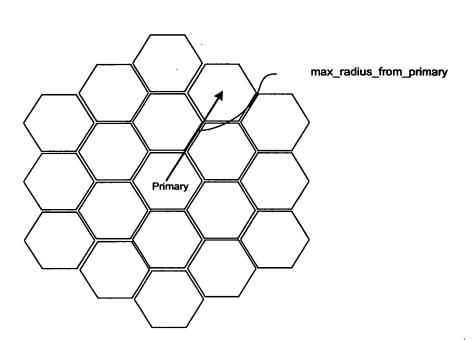


FIGURE 9

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3.1

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